

In the Claims

Claims 1-9 (cancelled).

Claim 10 (currently amended): A method of bonding a physical vapor deposition target material to a backing plate material, comprising:

joining the target material and backing plate material in physical contact with one another, the backing plate and target material both predominately comprising materials both consisting of aluminum; and

thermally treating the joined target and backing plate materials to simultaneously diffusion bond the target material to the backing plate material and develop grains in the target material, the diffusion bonding comprising solid state diffusion between the backing plate and target materials, a predominate portion of the developed grains having a maximum dimension of less than 100 microns.

Claim 11 (original): The method of claim 10 wherein all of the developed grains have the maximum dimension of the less than 100 microns.

Claim 12 (original): The method of claim 10 wherein the maximum dimension of the predominate portion of the developed grains is less than or equal to about 50 microns.

Claim 13 (original): The method of claim 12 wherein all of the developed grains have the maximum dimension of the less than or equal to about 50 microns.

Claim 14 (original): The method of claim 10 wherein the maximum dimension of the predominate portion of the developed grains is from about 30 microns to less than 100 microns.

Claim 15 (original): The method of claim 14 wherein all of the developed grains have the maximum dimension of from about 30 microns to less than 100 microns.

Claim 16 (cancelled).

Claim 17 (cancelled).

Claim 18 (cancelled).

Claim 19 (original): The method of claim 10 wherein the grain development comprises recrystallization of grains within the target material.

Claim 20 (original): The method of claim 10 wherein the grain development comprises growth of grains within the target material.

Claim 21 (original): The method of claim 10 further comprising, before the joining, work-hardening the target material.

Claim 22 (original): The method of claim 10 further comprising, before the joining, work-hardening the target material by compressing the target material from an initial thickness to a final thickness, the final thickness being less than or equal to about 40% of the initial thickness.

Claim 23 (original): The method of claim 10 further comprising, before the joining, work-hardening the target material by compressing the target material from an initial thickness to a final thickness, the final thickness being from about 40% to about 2% of the initial thickness.

Claim 24 (original): The method of claim 10 further comprising, before the joining, work-hardening the target material, and wherein the grain development comprises recrystallization of grains from the work-hardened material.

Claim 25 (original): The method of claim 10 further comprising, before the joining, work-hardening the target material, and wherein the grain development comprises:

recrystallization of grains from the work-hardened material; and

growth of the recrystallized grains.

Claim 26 (currently amended): A method of forming a physical vapor deposition target bonded to a backing plate, comprising:

joining a physical vapor deposition target material and backing plate material in physical contact with one another, the physical vapor deposition target and backing plate materials both comprising consisting of aluminum; and

thermally treating the joined physical vapor deposition target and backing plate materials under an atmosphere which is inert relative to reaction with the physical vapor deposition target and backing plate materials, the thermally treating simultaneously diffusion bonding the physical vapor deposition target material to the backing plate material and developing grains in the physical vapor deposition target material, the diffusion bonding comprising solid state diffusion between the backing plate material and the physical vapor deposition target material to adhere the physical vapor deposition target material to the backing plate material with a bond strength of at least about 5000 pounds/inch², and a predominate portion of the grains developed in the target material being less than 100 microns in maximum dimension after the thermally treating of the target and backing plate materials.

Claim 27 (cancelled).

Claim 28 (original): The method of claim 26 wherein the grain development comprises recrystallization of grains within the physical vapor deposition target material.

Claim 29 (original): The method of claim 26 wherein the thermally treating comprises maintaining the joined physical vapor deposition target material and backing plate material at a temperature of from about 280°C to about 400° for a time of from about 20 minutes to about 60 minutes and pressing the joined physical vapor deposition target and backing plate materials to a pressure of at least 12,500 pounds/in² during at least part of the time that the temperature is maintained.

Claim 30 (original): The method of claim 29 further comprising cooling the joined physical vapor deposition target and backing plate materials with a liquid after the temperature treatment.

Claim 31 (original): The method of claim 29 further comprising cooling the joined physical vapor deposition target and backing plate materials with a gas after the temperature treatment.

Claim 32 (original): The method of claim 26 wherein the grain development comprises growth of grains within the physical vapor deposition target material.

Claim 33 (original): The method of claim 26 further comprising, before the joining, work-hardening the physical vapor deposition target material.

Claim 34 (original): The method of claim 26 further comprising, before the joining, work-hardening the physical vapor deposition target material by compressing the physical vapor deposition target material from an initial thickness to a final thickness, the final thickness being less than or equal to about 40% of the initial thickness.

Claim 35 (original): The method of claim 26 further comprising, before the joining, work-hardening the physical vapor deposition target material by compressing the physical vapor deposition target material from an initial thickness to a final thickness, the final thickness being from about 40% to about 2% of the initial thickness.

Claim 36 (original): The method of claim 26 further comprising, before the joining, work-hardening the physical vapor deposition target material, and wherein the grain development comprises recrystallization of grains from the work-hardened material.

Claim 37 (original): The method of claim 26 further comprising, before the joining, work-hardening the physical vapor deposition target material, and wherein the grain development comprises:

recrystallization of grains from the work-hardened material; and
growth of the recrystallized grains.